PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Frank Sauer	EXAMINER: Chante E. Harrison
SERIAL NO.:	09/818,388	GROUP ART UNIT: 2677
FILED:	March 27, 2001	DOCKET: 2001P05445US

FOR: **AUGMENTED REALITY GUIDED INSTRUMENT POSITIONING WITH MODULATED GUIDING GRAPHICS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Examiner:

This reply is in response to the Office Action dated May 10, 2006. Please consider the following amendment and remarks.

The claims begin on page 2.

Remarks begin on page 8.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for augmented reality guided instrument positioning, comprising the steps of:

displaying a real view of an environment including an instrument;

determining a preferred path for positioning of said instrument;

marking the preferred path with a graphics guide;

augmenting the real view with a rendering of the graphics guide such that at least one portion of the graphics guide is transparent with respect to other portions of the graphics guide to provide a substantially unobstructed view through the at least one portion of the graphics guide to at least a portion of the instrument to facilitate alignment of the real instrument with the virtual guide, the transparency of at least one portion of the guide being varied at predefined time intervals;

aligning the instrument with the graphics guide so that the instrument appears in a same location as the graphics guide in the augmented view thereby creating a mutual spatial relationship between the real instrument and the virtual guide, and when properly aligned, at least a portion of the instrument is visible through the at least one transparent portion of the graphics guide; and

inserting the instrument in the graphics guide.

2. (Previously Presented) The method according to claim 1, wherein said rendering includes a modulation of the graphics guide's transparency along the length of the graphics guide, so that a plurality of portions of the graphics guide appear transparent with respect to other portions of the graphics guide along the length of the graphics guide to provide a substantially unobstructed view through the plurality of transparent portions of the graphics guide to a plurality of portions of the instrument once the instrument has been correctly aligned with the graphics guide.

3. (Canceled).

4. (Previously Presented) The method according to claim 1, wherein said rendering step comprises the step of sequentially varying the transparency of each of a plurality of portions of the graphics guide during at least one pre-defined time interval to provide a substantially unobstructed view through each of the plurality of portions to at least a portion of the instrument as the transparency of each of the plurality of portions is varied during the at least one pre-defined time interval.

5. (Original) The method according to claim 4, wherein the plurality of portions are consecutive.

6. (Previously Presented) The method according to claim 1, wherein said rendering step comprises the step of varying the transparency of the at least one portion of the graphics guide such that the at least one portion repeatedly switches between transparent and less transparent.

7. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a line, and said rendering step comprises the step of modulating the transparency of the line with respect to time so that the line repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the line is out of view.

8. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a line, and said rendering step comprises the step of modulating the transparency of portions of the line so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line.

9. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a line, and said rendering step comprises the step of modulating the transparency of portions of the line with respect

to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line during pre-defined time intervals.

10. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a cylinder, and said rendering step comprises the step of modulating the transparency of the cylinder with respect to time so that the cylinder repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the cylinder is out of view.

11. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a cylinder, and said rendering step comprises the step of modulating the transparency of portions of the cylinder so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder.

12. (Previously Presented) The method according to claim 1, wherein said determining step comprises the step of constructing the graphics guide as a cylinder, and said rendering step comprises the step of modulating the transparency of portions of the cylinder with respect to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder during pre-defined time intervals.

13. (Currently Amended) An apparatus for augmented reality guided instrument positioning, comprising:

a video camera providing a real view of an environment including an instrument;

a graphics guide generator for identifying a preferred path for positioning said instrument and generating a graphics guide for marking the preferred path; and

a rendering device for augmenting the real view with a rendering of the graphics guide such that at least one portion of the graphics guide is transparent with respect to other portions of the graphics guide to provide a substantially unobstructed view through the at least one portion of the graphics guide to at least a portion of the instrument to

facilitate alignment of the real instrument with the virtual guide, the transparency of at least one portion of the guide being varied at predefined time intervals;

an alignment device for aligning the instrument to the graphics guide so that the instrument appears in a same location as the graphics guide in the augmented view thereby creating a mutual spatial relationship between the real instrument and the virtual guide, and when properly aligned, at least a portion of the instrument is visible through the at least one transparent portion of the graphics guide; and

an insertion device for inserting the instrument in the graphics guide.

14. (Previously Presented) The apparatus according to claim 13, wherein said rendering device includes a modulation of the graphics guide's transparency along the length of the graphics guide, so that a plurality of portions of the graphics guide appear transparent with respect to other portions of the graphics guide along the length of the graphics guide to provide a substantially unobstructed view through the plurality of transparent portions of the graphics guide to a plurality of portions of the instrument once the instrument has been correctly aligned with the graphics guide.

15. (Canceled).

16. (Previously Presented) The apparatus according to claim 13, wherein said rendering device sequentially varies the transparency of each of a plurality of portions of the graphics guide during at least one pre-defined time interval to provide a substantially unobstructed view through each of the plurality of portions to at least a portion of the instrument as the transparency of each of the plurality of portions is varied during the at least one pre-defined time interval.

17. (Canceled).

18. (Previously Presented) The apparatus according to claim 13, wherein said rendering device varies the transparency of the at least one portion of the graphics guide such that the at least one portion repeatedly switches between transparent and less transparent.

19. (Previously Presented) The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a line, and said rendering device modulates the transparency of the line with respect to time so that the line repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the line is out of view.

20. (Previously Presented) The apparatus according to claim 13, wherein said determining device constructs the graphics guide as a line, and said rendering device modulates the transparency of portions of the line so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line.

21. (Previously Presented) The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a line, and said rendering device modulates the transparency of portions of the line with respect to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the line during pre-defined time intervals.

22. (Previously Presented) The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a cylinder, and said rendering device modulates the transparency of the cylinder with respect to time so that the cylinder repeatedly fades in and out of view to provide a substantially unobstructed view of the instrument when the cylinder is out of view.

23. (Previously Presented) The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a cylinder, and said rendering device modulates the transparency of portions of the cylinder so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder.

24. (Previously Presented) The apparatus according to claim 13, wherein said graphics guide generator constructs the graphics guide as a cylinder, and said rendering device modulates the transparency of portions of the cylinder with respect to time and space so that at least a portion of the instrument is substantially unobstructed when viewed through the portions of the cylinder during pre-defined time intervals.

25. (Currently Amended) A method for augmented reality guided instrument positioning, comprising the steps of:

displaying a real camera view of an environment including an instrument;

determining a preferred path of the instrument in the environment;

marking the preferred path with a graphics guide, the graphics guide indicating a predetermined position to which the instrument is alignable; and

augmenting the real camera view with a rendering of a virtual view of the graphics guide such that at least one portion of the graphics guide is transparent with respect to other portions of the graphics guide to provide a substantially unobstructed view through the at least one portion of the graphics guide to at least a a portion of the instrument to facilitate alignment of the real instrument with the virtual guide, the transparency of at least one portion of the guide being varied at predefined time intervals;

aligning the instrument to the graphics guide so that the instrument appears in a same location as the graphics guide in the augmented view thereby creating a mutual spatial relationship between the real instrument and the virtual guide, and when properly aligned, the instrument is visible through the at least one transparent portion of the graphics guide; and

inserting the instrument in the graphics guide.

26. (Canceled).

27. (Canceled).

28. (Canceled).

REMARKS

Claims 1, 2, 4-14, 16, and 18-25 are pending in the case. Claims 1, 13 and 25 have been amended and claims 3, 15 and 28 have been canceled. No new matter has been added to this application.

Objection to Claims 3-5, 7, 9, 10, 12, 15, 16, 19, 21, 22, 24 and 28

The Examiner has objected to claims 20, 7, 9, 10, 12, 15, 16, 19, 21, 22, 24 and 28 as being dependent on a rejected independent claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claim. Applicants have amended independent claims 1, 13 and 25 to include the limitations of objected to claims 3, 15 and 28 respectively. Applicants respectfully submit that claims 1, 13 and 25, as amended are in condition for allowance. Claims 2, 4-12, 14, 16 and 18-24, being dependent upon independent claims 1 and 13 respectively, are also in condition for allowance.

Rejection of claims1, 2, 6, 8, 11, 13, 14, 18, 20, 23 and 25 under 35 U.S.C. §102(e)

Claims 1, 2, 6, 8, 11, 13, 14, 18, 20, 23 and 25 have been rejected under 35 U.S.C. 102(e) as being unpatentable over Kienzle, U.S. Pub. No. 2005/0119561 A1. Applicants respectfully submit that this rejection is moot in light of Applicants' amendments to independent claims 1, 13 and 25. Applicants respectfully request that the rejection of claims 1, 2, 6, 8, 11, 13, 14, 18, 20, 23 and 25 under 35 U.S.C. 102(e) be withdrawn.

Conclusion

For the forgoing reasons, the present application, including claims 1, 2, 4-14, 16, and 18-25, is believed to be in condition for allowance. The Examiner's early and favorable action is respectfully urged.

Respectfully Submitted,

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Date: August 9, 2006
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